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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

YEE, DEBORAH

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

12/03/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/790,931	Applicant(s) TAKAYAMA ET AL.	
	Examiner Deborah Yee	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 October 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-15,17-20 and 22-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-8,10-15,17-20 and 22-24 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7/28/04 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 14, 2008 has been entered.

Terminal Disclaimer

2. The terminal disclaimer filed on May 14, 2008 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of any patent granted on commonly owned pending reference application Serial No. 10/790,959 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claim 17 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one

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skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

5. The amendment to Claim 17 dated May 14, 2008 clearly raises a new matter issue for the reasons stated in the Advisory Action dated June 10, 2008.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claim 10 recites "a gear having teeth, and wherein the relationship between a DI value in inches indicating the hardenability of a martensite phase". The recited limitation is indefinite because the DI value is indicated as the hardenability of martensite phase yet pages 27-28 of Applicant's specification indicates DI value as the hardenability of the austenite phase. Also limitation is confusing because hardenability cannot be measured in terms of inches. In addition, if DI value is the hardenability of the austenite phase, claim 10 and its parent claim 1 does not actively recite austenite phase.

9. Claim 10 further recites "a gear module M, wherein M is a value obtained by pitch circle diameter divided by the number of teeth". Limitation is indefinite because it is uncertain how pitch circle diameter is measured and with what unit of measurement.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1, 3-8, 10-15, 17-20 and 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 3,663,314 ("Monma") alone or in view of US 2002/0029597 ("Choe") or English abstract of Japanese patent 408081738 ("JP-738").

12. Monma discloses specific bearing steel examples 14 to 19 in Table IV in columns 3-4 that meet the composition and surface layer limitations recited by claim 1. Note examples contain Cr and C within the ranges of 0.45 to 1.5% C and 0.3 to 1.5%Cr recited by claim 1, and have a quench-hardened surface layer tempered at low temperature whereby surface layer contains cementite (designated as C percent in Table IV) within the vol% range of 2 to 18% dispersed in a martensite parent phase and solid-dissolving carbon (designated D in Table IV) within the range of 0.25 to 0.8% recited by claim 1.

13. Even though Cr concentration in cementite at 2.5 to 10 % recited by claim 1 is not taught, such would be expected since composition and process of making limitations are met. See lines 5 to 20 of column 5 wherein steel is subjected to normalizing (normalizing is defined as heat treating in austenitic temperature range A1 or higher followed by air cooling, and is equivalent to Cr concentration treatment step

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recited by claim 18), spheroidize annealing and case hardening by austenitizing, oil quenching and tempering.

14. Monma on line 7 of column 5 discloses mean carbide particle size (cementite) at 0.6 microns which is within the average cementite particle diameter of 0.1 to 1.5 microns recited by claim 3.

15. Although pearlite or retained austenite as recited by claims 4 and 5 respectively are not disclosed by Monma such would be expected since composition and process limitations are met and in absence of proof to the contrary.

16. Even though a prior austenite grain size of ASTM 10 or higher recited by claim 6 is not taught, such would not be a patentable difference since it is a past rather than a present property.

17. Monma discloses specific bearing steel examples 26 to 32 in Table VII of column 7 containing Si; and hence meet claim 7.

18. Monma meets claim 8 because claim recitation only requires Ni when Al is added.

19. In regard to process claims 17 to 20 and 22, Monma on lines 5 to 20 of column 5 discloses normalizing (heating at austenitic temperature range and cooling) which is equivalent to applicant's Cr concentration treatment step of heating at A1 to 900°C followed by cooling, spheroidizing and case hardening by austenitizing, quenching and tempering.

20. Monma further teaches using steel for a rolling bearing element which would include a gear as recited by claims 10 to 15. Even though prior art does not teach shot

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peening as a finishing step to produce a residual compressive stress on the surface of the rolling bearing element as recited by one or more of the dependent claims, such would not be a patentable difference. Note that Choe in paragraph 23 discloses subjecting a rolling bearing element (gear) with an induction hardened martensitic surface to shot peening to produce a high compressive residual stress of at least 50 kgf/mm² to improve fatigue strength is known in the art. Since fatigue strength is desired and sought by Monma, and then it would be an obvious process step well within the skill of the artisan to incorporate.

21. Even though prior art does not teach the DI formula as recited by claim 10, such would be expected since microstructure is closely and it is also admitted on page 28 of Applicant's specification that gears conventionally have a M-value of ≤ 6 . In addition Applicant has not demonstrated (e.g. by comparative test data) that claimed formula is somehow critical and productive of new and unexpected results.

22. Even though prior art does not specifically add 0.1 to 0.5% V as recited by claims 23 and 24, such would be a matter of choice well within the skill of the artisan to incorporate since V is a conventional additive to analogous bearing steels to improve hardenability, see Monma on lines 56-57 of column 7 and English abstract of JP-738.

Allowable Subject Matter

23. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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24. The following is a statement of reasons for the indication of allowable subject matter:

25. The art of record does not teach or suggest case-hardened rolling element, as recited by claim 9, containing 0.05 to 0.2 wt% in total of one or more alloy elements selected from the group consisting of Ti, Zr, Nb, Ta, and Hf, and one or more compounds selected from the group consisting of the carbides, nitrides and carbontirides of said alloy elements, said compounds having an average particle diameter of 0.1 to 5 μm and are dispersed with the steel material, wherein the rolling contact surface layer contains 0.5 to 1.5 wt% C.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Deborah Yee whose telephone number is 571-272-1253. The examiner can normally be reached on monday-friday 6:00 am-2:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Deborah Yee/
Primary Examiner, Art Unit 1793

/DY/